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PHYSICAL ANTHROPOLOGY IN AMERICA

AN HISTORICAL SKETCH

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I—INTRODUCTION

THE term Anthropology is generally employed in this country to comprehend the entire field of researches relating to man. The present paper, however, does not aim to compass this wide range but relates exclusively to Physical Anthropology, sometimes called somatology. Geographically it is limited to the northern half of the continent and especially to that part of it under the jurisdiction of the United States, while chronologically it stops before the actual era of the science and its living representatives.

No special and comprehensive effort has hitherto been made in this direction, though as early as 1855, in his "Archæology of the United States,"[1] Samuel F. Haven gave an extended and very creditable account of the general opinions advanced to that time respecting the origin of population in the New World, and of the progress to that date of archeological and anthropological investigations in the United States. In 1898 Dr George A. Dorsey wrote the "History of the Study of Anthropology at Harvard University,"[1] but he used the term "anthropology" in "its broadest, most general sense," and "somatology" received but slight mention; and in 1902 Dr George G. MacCurdy wrote on the "Teaching of Anthropology in the United States."[2] There are no other publications on the subject and the task before the writer was thus the more gratifying though also the more difficult one of research rather than of compilation.

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[1] *Smithsonian Contributions to Knowledge*, Phila., 1855, pp. 168.

The history of physical anthropology on this continent is relatively a brief one, dating back less than a century, yet preceding the beginnings of the same branch of science in most other countries and antedating the very use, in its modern sense, of the term anthropology. Also, though largely disconnected and individualistic, that is, represented by workers who arose quite incidentally, sometimes far apart and more or less independently of each other, it nevertheless presents a total record that is highly creditable and should be better known outside of this country.

It is almost wholly a history of anthropologists who were originally or at the same time medical men and especially anatomists or physiologists, and whose field of research was in a very large measure, though not exclusively, American. And this history is further distinguished by the fact that its beginnings, as to both time and mode, can be almost exactly determined.

II—FORERUNNERS OF AMERICAN ANTHROPOLOGY

In a given country the history of any new branch of science would probably show, if it could be traced, a shorter or a longer preparatory period, occupied with the growth of interest in a new direction; the beginnings of collections or assembling of data; and the first efforts at lectures, writing, and association in the new field. Back of this, however, there is, as a rule, a long, unconsciously cumulative epoch, the slow preparation of the ground. The actual birth of a new science may be counted from the commencement of substantial research work in the new field, which in due time is followed by differentiation of concepts, advanced organization of forces and plans, standardization of procedures, and a gradual development of regular instruction. Such was the course of physical anthropology in the United States and the rest of North America.

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[1] *Denison Quarterly*, Granville, O., 1888, IV, No. 2, pp. 77–97.

[2] *Science*, XV, 1902, 211–216.

For the fertilization of the field in this country nothing could have been more effective than the presence on the American continent of a race whose identity, composition, and origin were problems that from the date of discovery interested the whole world, a solution of which, however, never advanced beyond a maze of hypotheses. To this, toward the beginning of the 19th century, was added the fact that the white man's contact with the Indian in North America was becoming extensive, and the need of knowing the race better, physically as well as culturally, was felt with growing intensity. Good evidence of this feeling can be seen in the excellent instruction given in 1804 by President Jefferson to Lewis and Clark, for their memorable expedition to the sources of the Missouri. Besides other things they were to look into the "moral and physical circumstances which distinguish the Indians encountered from the tribes we know";[1] and the results of this expedition helped greatly to further stimulate the universal interest in the Indian. An equally marked influence in this direction was due to a growing acquaintance with the multitude of mounds in the Ohio valley and adjoining regions on one hand, and with the Peruvian, Mexican, and Central American Indian remains on the other. Added to these factors at home came potent influences from abroad. Works on the natural history, races, and variation of man were published by Buffon, Linnæus, and Cuvier, and especially by Blumenbach[2] and Prichard.[3] In 1789 there was organized at Paris the *Musée d'Histoire naturelle*, which eventually in its scope comprised also man; in 1800 there came into existence, in Paris, the Society of Students of Man (*Société des observateurs de l'homme*), which, although short-lived, pointed to a new sphere of investigations of great interest; and before many years had passed the early physiological phrenology began to call attention to the importance of the study of the skull.

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[1] See *History of the Expedition under the Command of Lewis and Clark*, etc., by Elliott Coues, 4 vols., N. Y. 1893.

[2] *Decades craniorum*, 1790–1828 (1873); *De generis humani*, etc., 1795 (3d ed.).

[3] *Researches into the Physical History of Mankind*, 1813 (1st ed.).

As the first most tangible result of these influences in North America we see the incorporation, in 1812, at Worcester, Mass., of The American Antiquarian Society, with the chief object of "collecting and preserving the material for a study of American history and antiquities."[1] We learn that, "in the early days of the Society one of the prominent features of its work was the collection of anthropological specimens"; and we find that the first two volumes of the Transactions of this Society are devoted to the American Indian and his remains.[2]

The year 1814 marks the beginning in Boston of The Linnean Society, the predecessor of the Boston Society of Natural History (1830); but there is no evidence that the study of man derived any special stimulus through the activities of this organization. Shortly thereafter, however, a small nucleus for anthropologic research took form through the labors of Prof. John C. Warren, the eminent anatomist and surgeon and future founder of the present Warren Anatomical Museum of Harvard University. Inspired evidently by Blumenbach's works, Professor Warren began to collect and examine skulls of different races, and in 1822 he published an "Account of the Crania of some of the Aborigines of the United States,"[3] the first publication in this field on the continent. This publication, while of no permanent value scientifically, and while subscribing to the early error that the "mound-builders" were "a different people from the aborigines found here by our ancestors," is nevertheless remarkable for the systematic, technical descriptions of the specimens. In this respect it might well have served as a shining example to some later writers on the same subject.

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[1] *Transactions American Antiquarian Society*, Worcester, Mass., 1909, pp. 32.

[2] The first volume, published in 1820, contains Atwater's "Description of the antiquities of the Ohio and other historical states"; Hennepin's "Discovery of the Mississippi"; Johnston's "Indian tribes of Ohio"; and Sheldon's "Account of the Caribs of the Antilles." Vol. II, 1836, contains Gallatin's "Indian tribes of North America," and Daniel Gookin's "Historical Account of the Christian Indians of New England."

[3] Published as part H of the Appendix to his *Comparative View of the Sensorial and Nervous Systems in Man and Animals*, Boston, 1822, pp. 129–144, pls. V–VIII.

A year before the appearance of his paper on American crania Professor Warren published *A Description of an Egyptian Mummy*,[1] and an address by him on American crania, given before the British Association, is also quoted in the *Boston Medical and Surgical Journal* (XVII, 1838, pp. 249–253), but evidently his preoccupations were such that he could give the new subject relatively little attention. That he did not lose interest in the study of human crania is evident from the fact that in 1837 he engaged no less a student than Henry R. Schoolcraft to collect Indian crania for him. Owing to various difficulties, however, the gathering of the desired material was interfered with, so that the collection was restricted. The material was eventually transferred to the Warren Museum.

In the thirties collection and study of human skulls received great impetus in this country through the establishment at Boston and Washington of phrenological societies, which interested at that time many physicians and other men of science. In 1835 the Boston Phrenological Society published a catalogue of specimens belonging to the Society derived mainly from the collections "of the late Dr Spurzheim and J. D. Holm," embracing four hundred and sixteen entries, among them more than a hundred racial skulls or casts of skulls.

Such was in brief the prodromal period of physical anthropology in this country, and we can now approach its more effective beginnings.

III—THE BEGINNINGS OF AMERICAN ANTHROPOLOGY—SAMUEL G. MORTON

Physical Anthropology in the United States, speaking strictly, begins with Samuel G. Morton, in Philadelphia, in 1830.

Morton, who was born in Philadelphia, January 26, 1799, received the degree of M.D. at the Medical College of the University of Pennsylvania in 1820 and from the Medical School of the

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[1] Pamphlet 1821; and later gave "An Account of the Siamese Twin Brothers," *Amer. Med. Jour.*, Med. Sciences, v, p. 253.

University of Edinburgh three years later.[1] In 1826 he began to practise medicine in Philadelphia and soon after engaged in private instruction in medicine and anatomy. Even before this, however, he became a member of the Academy of Natural Sciences of Philadelphia, took active interest in its collections which he helped to classify and arrange, and became active in several branches of natural science, particularly paleontology. During these years, as anatomist, he also became interested, through the writings of Lawrence, Virey, Bory de St Vincent, Gall, and Combe, on the one hand, and through reading the publications of such American authors as Dr Barton, Professor Caldwell, Dr J. C. Warren, Professor Gibson, Dr B. H. Coates, and Dr M'Culloh,[2] on the other, in the rising comparative human anatomy, in phrenology (which doubtless seemed at that time a most promising branch of research), and in questions relating to the origin and racial affiliations of the American Indians.

According to J. Aitken Meigs, "craniographic" researches were begun by Morton two years after the completion of Blumenbach's *Decades craniorum*. According to Morton himself, however, the beginning of his actual work in anthropology is related to have occurred as follows:[3] "Having had occasion, in the summer of 1830, to deliver an introductory lecture to a course in Anatomy, I chose for my subject: The different forms of the skull, as exhibited in the Five Races of Men. Strange to say, I could neither buy nor borrow a cranium of each of these races; and I finished my discourse without showing either the Mongolian or the Malay. Forcibly impressed with this great deficiency in a most important branch of science, I at once resolved to make a collection for myself." The results of this resolution were that between 1830 and 1851, the latter the year of his death, Morton gathered 968 racial crania, which, with 67 additional specimens that came soon after his death, constituted by far the largest and most valuable collection of anthropological materials then in existence.

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[1] Grant, Wm. R., *Lecture introductory to a course on Anatomy and Physiology in the Med. Dept. of Pennsylvania College, delivered October 13, 1851;* 8°, Phila., 1852, pp. 1–16. Meigs, Charles D., M.D., *A memoir of Samuel G. Morton, M.D., read Nov. 6, 1851,* published Phila., 1851, 8°, pp. 1–48.

[2] *Crania Americana,* preface, et seq.

[3] Morton, S. G., Account of a Craniological Collection, *Trans. of the Amer. Ethnolog. Soc.,* II, pp. 217–218, N. Y., 1848.

With the augmentation of his collection grew evidently also Morton's interest in craniological research and in anthropology in general, leading eventually, with such additional stimuli as were furnished by the writings of Prichard, Lawrence, Humboldt, and possibly Anders Retzius, to active personal investigations in these lines. Finding a helping hand in the much interested and ingenious member of the Academy, John S. Phillips, Esq., Morton undertook the large task of measuring and describing his material, and the American collections received first attention. A very sensible schedule of measurements was formulated on the imperfect basis then extant; instruments where insufficient or lacking were improved or invented, and after "some years of toil and anxiety" sufficient data were gathered and excellent illustrations provided for an important publication.

In 1839 Morton was appointed Professor of Anatomy in Pennsylvania Medical College, and in the same year his truly monumental work for that time, *Crania Americana*, appeared, a volume not financed by any publisher or institution, but undertaken by the author with the assured support of only fifteen subscribers!

This first and largest work of Morton makes manifest some of the defects of the early period in anthropology, and it includes a chapter on phrenology, though it is the physiological phrenology of Morton's time and has no trace of the charlatanism later associated with the name; but these defects are slight when contrasted with the large bulk of astonishingly good work and the number of sound conclusions. One wonders at the nearness with which the measurements employed by Morton correspond with later and even present-day measurements in that line, and at the soberness and clear-sightedness of his deductions. As to phrenology, it is evident that Morton's interest in that branch was not that of a believer or promoter, but rather that of a friendly and hopeful investigator.[1] As to the lithographic illustrations of the work, they have not been excelled in beauty and accuracy.

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[1] See prologue by John S. Phillips, Esq., in *Crania Americana*.

Morton's principal aims in preparing and publishing the *Crania Americana* were, in his own words, "to give accurate delineations of the skulls" representing as many Indian nations, from all parts of the American continent, as he could bring together in his collection; to show the position of the American crania with reference to those of other races; and to determine "by the evidence of osteological facts, whether the American aborigines of all epochs have belonged to one race or to a plurality of races." But thus early Morton gave attention also to the artificial deformation of skulls, and especially to the determination of the internal cranial capacity in various races, taking cognizance not only of the entire skull cavity but of its main subdivisions as well. Moreover, he presented, in 62 pages of his work, an excellent review of the contemporary anthropological knowledge of peoples in all parts of the world, a summary which shows good discrimination and much erudition.

The craniometric methods of Morton (and Phillips) call for special note. Not counting the more complex determinations of the facial angle and internal capacity, Morton took on each skull ten measurements, and of these the most important six were taken from precisely the same landmarks and in the same way as they are taken today under the recent Monaco agreement, though Morton was not remembered at that convention. These measurements and the manner in which they were made were, in the words of Morton[1] himself, as follows:

"The *longitudinal diameter* is measured from the most prominent part of the os frontis, between the superciliary ridges, to the extreme end of the occiput.

"The *parietal diameter* is measured between the most distant points of the parietal bones. . . .

"The *vertical diameter* is measured from the fossa between the condyles of the occiput bone,[2] to the top of the skull.

"The *occipito-frontal arch* is measured by a tape over the surface of the cranium, from the posterior margin of the foramen magnum to the suture which connects the os frontis with the bones of the nose.

"The *horizontal periphery* is measured by passing a tape around the cranium so as to touch the os frontis immediately above the superciliary ridges, and the most prominent part of the occipital bone.

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[1] *Crania Americana*, pp. 249–250.

[2] The present *basion*.

"The *zygomatic diameter* is the distance, in a right line, between the most prominent points of the zygomæ."

The terms used in describing the measurements are perhaps not as specific as those which would be employed today, nearly eight decades later, but the meaning is unmistakably identical. The four other measurements, which now are no more or but seldom employed, were the *frontal diameter*, taken between the anterior-inferior angles of the parietal bones, the *inter-mastoid arc* and *line*, and the *joint length of the face and vault.*

The *facial angle* was measured directly by an improved *facial goniometer*, while for obtaining the *internal capacity* of the skull a method was invented which, though seldom if ever duly credited, served and still serves as the basis of all subsequent procedures for obtaining this important determination with dry substances. Morton's description of the method, which deserves to be quoted in full, is as follows:[1]

"*Internal Capacity.*—An ingenious mode of taking this measurement was devised by Mr. Phillips, viz: a tin cylinder was provided about two inches and three-fourths in diameter, and two feet two inches high, standing on a foot, and banded with swelled hoops about two inches apart, and firmly soldered, to prevent accidental flattening.—A glass tube hermetically sealed at one end, was cut off so as to hold exactly five cubic inches of water by weight, at 60° Fahrenheit. A float of light wood, well varnished, two and a quarter inches in diameter, with a slender rod of the same material fixed in its centre, was dropped into the tin cylinder; then five cubic inches of water, measured in the glass tube, were poured into the cylinder, and the point at which the rod on the float stood above the top of the cylinder, was marked with the edge of a file laid across its top; and the successive graduations on the float-rod, indicating five cubic inches each, were obtained by pouring five cubic inches from the glass tube *gradatim*, and marking each rise on the float-rod. The gradations thus ascertained, were transferred to a mahogany rod fitted with a flat foot, and then subdivided, with compasses for the cubic inches and parts. In order to measure the capacity of a cranium, the foramina were first stopped with cotton, and the cavity was then filled with *white pepper seed* poured into the foramen magnum until it reached the surface, and pressed down with the finger until the skull would receive no more. The contents were then transferred to the tin cylinder, which was well shaken in order to pack the seed. The mahogany rod being then dropped down with its foot resting on the seed, the capacity of the cranium in cubic inches is at once read off on it."

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[1] *Crania Americana*, p. 253.

The most important scientific conclusion arrived at by Morton in his studies of American crania and their comparison with similar material from other parts of the world, conclusions which he held strongly to the end of his life, were (1) "That the American nations, excepting the Polar tribes (Eskimo), were of one Race and one Species, but of two great Families (Toltecan and Barbarous), which resemble each other in physical, but differ in intellectual character"; and (2) "That the cranial remains discovered in the Mounds, from Peru to Wisconsin belong to the same race (the Indian), and probably to the Toltecan family."[1] These conclusions subverted the numerous loosely formed but commonly held theories respecting the racial complexity of the American natives, and of racial separation of the "Mound-builders" from the rest of the American Indians.

Besides this, Morton's work must have proved highly useful as a contemporary compendium of anthropological knowledge; it established the main proportions of the skulls of many American tribes; it gave comparisons of skull capacity in series of skulls representing the five human races of Blumenbach's classification; it shed considerable light on the subject of artificial deformation of the head among the American natives; and it gave for the first time excellent illustrations, both plates and figures, of many American crania, which could be used in comparative work by investigators to whom original American crania were not accessible.

The few erroneous statements and conclusions included were due entirely either to imperfect contemporaneous knowledge in anthropology or to lack of material. The latter deficiency, for example, was directly responsible for Morton's opinion, supported by ten skulls which he called "Mongolian" but which were in reality only those of Chinese and Eskimo, that the American race differed essentially from all others, not excepting the Mongolian.[2]

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[1] *Crania Americana*, p. 260; also p. 62 et seq.

[2] Ibid., p. 260.

The terms "Toltecan" and "Barbarous" were also, we now know, misnomers, and the classification of all the Indians into these two families was a mistake, though when it was made it served a good purpose as a basis for further investigation.

Morton intended to follow the *Crania Americana* with a "supplementary volume" in which to "extend and revise both the Anatomical and Phrenological tables, and to give basal views of at least a part of the crania delineated"; also to "measure the anterior and posterior chambers of the skull in the four exotic races of man, in order to institute a comparison between them respectively, and between these and those of the American Race."[1] This, on account of his untimely death, was never accomplished. Nevertheless the remainder of Morton's life was largely devoted to anthropology, and resulted in the publication of more than twenty papers on subjects relating in the main, but by no means exclusively, to America. The most important of these publications, and one that compares favorably in clearness of presentation and the validity and advanced nature of its conclusions with *Crania Americana*, was his *Crania Ægyptiaca*, published in 1844 and dealing with one hundred old and thirty-seven modern Egyptian skulls procured for Morton by a United States consul at Cairo, subsequently an anthropological author of note, George R. Gliddon. Without entering into details, it will be sufficient to say that Morton through his studies recognized definitely that "the valley of the Nile, both in Egypt and in Nubia, was originally peopled by a branch of the Caucasian race"; and that "the present Fellahs are the lineal and least mentioned descendants of the ancient Egyptians; the latter being collaterally represented by the Tuaregs, Kabyles, Siwahs, and other remains of the Lybian family of nations."

Of his remaining papers the more noteworthy were those on a "Method of Measuring Cranial Capacity"; "On Hybridity of Animals," etc.; on "The Size of the Brain in Various Races and Families of Man"; and on the "Physical Type of the American Indians."

Following is Morton's complete anthropologic bibliography.

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[1] *Crania Americana*, preface, p. v.

Besides these works he published an excellent textbook on *Human Anatomy*.

Crania Americana. 4°. Phila., 1839.

Method of measuring cranial capacity. Proc. Acad. Nat. Sci. Phila., I, 1841, pp. 7–8.

Mexican Crania (Otomi, Chechemec, Tlascalan, Aztec). Proc. Acad. Nat. Sci. Phila., I, 1841, pp. 50–51.

Cranial sutures. Proc. Acad. Nat. Sci. Phila., I, 1841, pp. 68–69.

Pigmy "race" of Mississippi valley. Proc. Acad. Nat. Sci. Phila., I, 1841, pp. 215–216.

Negro skulls, capacity. Proc. Acad. Nat. Sci. Phila., I, 1841, p. 135.

Yucatan (Ticul) skeleton. Proc. Acad. Nat. Sci. Phila., I, 1842, pp. 203–204.

Observations on Egyptian ethnography, derived from anatomy, history, and the monuments. Trans. Amer. Philos. Soc. Phila., IX, 1843, pp. 93–159.

Crania Ægyptiaca. 4°, Phila., 1844.

Observations on a second series of ancient Egyptian crania. Proc. Acad. Nat. Sci. Phila., II, 1844, pp. 122–126.

Observations on the measurements of the internal capacity of the crania deposited [by Morton] this evening. Proc. Acad. Nat. Sci. Phila., II, 1844, pp. 168.

The skull of a Hottentot. Proc. Acad. Nat. Sci. Phila., II, 1844, pp. 64–65.

Two ancient Peruvian heads from Atacama deformed. Proc. Acad. Nat. Sci. Phila., II, 1845, pp. 274.

Skull of a Congo negro. Proc. Acad. Nat. Sci. Phila., II, 1845, pp. 232–233.

Skulls of New Hollanders (Australians). Proc. Acad. Nat. Sci. Phila., II, 1845, pp. 292–293.

Remarks on an Indian cranium found near Richmond, on the Delaware, and on a Chenook mummy. Proc. Acad. Nat. Sci. Phila., III, 1847, p. 330.

On an aboriginal cranium obtained by Dr Davis and Mr Squier from a mound near Chillicothe, Ohio. Proc. Acad. Nat. Sci. Phila., III, 1847, pp. 212–213.

Skeletal remains from Arica, Peru. Proc. Acad. Nat. Sci. Phila., III, 1848, pp. 39–40.

On hybridity of animals, considered in reference to the question of the unity of the human species. Proc. Acad. Nat. Sci. Phila., III, 1848, pp. 118–121.

On the position of the ear in the ancient Egyptians. Proc. Acad. Nat. Sci. Phila., III, 1848, p. 70.

The catalogue of skulls of man and the inferior animals, in the collection of Samuel G. Morton, M.D., Phila., 1849 (with two subsequent editions).

Observations on the size of the brain in various races and families of man. Proc. Acad. Nat. Sci. Phila., IV, 1850, pp. 221–224.

Four skulls of Shoshonee Indians. Proc. Acad. Nat. Sci. Phila., IV, 1850, pp. 75–76.

Ancient Peruvian crania from Pisco. Proc. Acad. Nat. Sci. Phila., IV, 1850, p. 39.

Observations of a Hottentot boy. Proc. Acad. Nat. Sci. Phila., IV, 1850, pp. 5–6.

Physical type of the American Indians. In Schoolcraft, Indian Tribes, II, Phila., 1852, pp. 316–330. Unity of the human race, ibid., III, pp. 374–375.

IV—EFFECTS OF MORTON'S WORK

Under Morton's stimulus and with his coöperation the physical anthropology of the American Indian received attention in a number of important ethnological and archeological works published before or soon after his decease. Thus the first scientific memoir published by the Smithsonian Institution, the highly creditable Squier and Davis's "Ancient Monuments of the Mississippi Valley,"[1] included five pages of text and two excellent plates on the "Crania from the Mounds." The main part of this report was by Morton himself. One skull only is described, but it was a very good, undeformed, or but very slightly deformed specimen, derived from an ancient mound in Scioto valley, Ohio. For comparison there are given measurements of 308 mound, "tumuli," and Indian crania[2] of different ages and from different parts of the North American continent and Peru. Curiously, and against the previously expressed opinion of Morton, Squier and Davis assumed in this connection that there had existed a special "race of the mounds," the skull described "belonging incontestably to an individual of that race." Regarding skeletal remains from the mounds in general, however, they well recognized that these were "of different eras," the superficial burials being comparatively late and to be ascribed to the Indian tribes in occupancy of this country at the period of its discovery.

In the same year (1848) appeared the second volume of the *Transactions of the American Ethnological Society*, which contains important ethnological contributions and maps by Hale and Gallatin in an article on the "Indians of North America." Neither of these contributions added directly to physical anthropology, but both contained valuable data on the early distribution of the North

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[1] *Smithsonian Contributions to Knowledge*, I, N. Y., 1848, pp. 288–292, pl. xlvii–xlviii.

[2] Mainly from Morton's *Crania Americana*.

American Indians, on the population of some of the tribes, and on their environment. There are notes on the physical appearance of the Indians of various types,[1] but these are quite imperfect. In the same volume also appears Morton's "Account of a craniological collection, with remarks on the classification of some families of the human race."[2] This brief contribution is interesting partly because in it Morton shows in a few words how he was led to the collection and study of American crania, and partly because he reiterates his conviction as to the racial unity of all the American nations, barring the Eskimo.[3]

Even more important than both of the works heretofore mentioned in this section was the great encyclopedia of knowledge concerning the American Indian, prepared by a special provision of the United States Congress under the auspices of the Bureau of Indian Affairs, and published between 1851 and 1857, by Henry R. Schoolcraft in collaboration with a number of other authors.[4] This work gave much reliable information on the geographic distribution of the Indian tribes in North America; on their migration; on the conditions of the Indian family, including birth and death; on the intellectual capacity of the Indian; and on the statistics and population of the tribes. Besides this, it included a series of articles dealing directly with the physical anthropology of the Indian. These comprised the "Essay on the physical characteristics of the Indian," by Samuel G. Morton (II, 315–330); "Admeasurements of the crania of the principal groups of Indians of the United States," by J. S. Phillips (II, 331–335); "Examination and distribution of the hair of the head of the North American

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[1] Particularly in Hale, chapter Ethnology, pp. 5–8.

[2] Pp. 217–222.

[3] P. 218: "The anatomical facts considered in conjunction with every other species of evidence to which I have had access, lead me to regard all the American nations, except the Esquimaux, as people of one great race or group. From Cape Horn to Canada, from ocean to ocean, they present a common type of physical organization, and a not less remarkable similarity of moral and mental endowments."

[4] Complete title: *Historical and Statistical Information respecting the History, Condition and Prospects of the Indian Tribes of the United States, collected and prepared under the direction of the Bureau of Indian Affairs: per act of Congress of March 3d, 1847*, by Henry R. Schoolcraft, LL.D. 6 vols., 4°, Phila., 1851–1857.

Indian," by Peter A. Browne, LL.D. (III, 375–393); "Considerations on the distinctive characteristics of the American aboriginal tribes," by Dr Samuel Forrey (IV, 354–365); and "Unity of the human race" (373–375), "Remarks on the means of obtaining information to advance the inquiry into the physical type of the Indian" (IV, 345–353), and "The aboriginal features and physiognomy" (V, 287–292), by Schoolcraft himself.

Meanwhile also a number of publications appeared in the United States bearing on physical anthropology, which were incited not so much by Morton as by Lawrence (*Lectures on the Natural History of Man*) and especially Prichard (*Natural History of Mankind*) in England. Three volumes belonging to this category were *The Races of Man*, by Dr Charles Pickering (*Publications of the United States Exploring Expedition*, 4°, Boston, 1848); the *Natural History of Man*, by Wm. N. F. Van Amringe (8°, New York, 1848); and *The Natural History of the Human Species*, by Lieutenant Colonel Charles Hamilton Smith (8°, Boston, 1851).

These volumes, as seen in part from their titles, deal comprehensively and more or less philosophically with mankind as a whole. The two more valuable ones are those of Smith and Pickering, both presenting good summaries of contemporaneous knowledge of the subjects with which they deal. Van Amringe wrote on the basis of biblical data; nevertheless his book also contains many a good thought. The works of both Smith and Pickering were published later in new editions, the former in 1859 (Boston), with additions by Dr S. Kneeland; and the latter in 1854 (London), with *An Anatomical Synopsis of the Natural History of Man*, by Dr John Charles Hall.

The influence of these publications was more of a general nature. They were largely read, educating and influencing the public mind on a subject which was then claiming a large share of the attention of all thoughtful minds, without actually adding much to existing knowledge or stimulating intensive research.

During the latter part of the first and the early part of the second half of the 19th century there were also several other important occurrences, the results of which served to enhance interest in anthropology, particularly that of the American aborigines. These were the numerous Government exploring expeditions to the far Northwest, West, and Southwest, under Wilkes (1838–'42), Frémont (1842–'44), Emory (1846–'47), Stansbury (1849), and others; and the extensive Pacific Railroad Surveys of 1853–'54, comprising the explorations of Parke, Whipple, Pope, Stephens, Williamson, and their companions.

V—Morton's Successors—Joseph Leidy and J. Aitken Meigs

From what precedes it is plain that Morton may be termed justly and with pride the father of American anthropology; yet it must be noted with regret that he was a father who left many friends to the science and even followers, but no real progeny, no disciples who would continue his work as their life vocation.

The collection of racial crania which Morton assembled was purchased from his executors, for the sum of $4,000, by forty-two gentlemen of Philadelphia and by them presented to The Academy of Natural Sciences of Philadelphia, where it rests a sad relic to the present day; the Academy, whether owing to lack of scholars or for other reasons, failed to provide for further research in connection with the precious material or for systematic accessions. What might not the Academy have been to American anthropology had circumstances been different! However, the time was doubtless not ripe.

As it was, two men were approached with a view to continuing Morton's work, either of whom would have made a thorough success of the undertaking had he been in a position to devote himself exclusively to anthropology. They were Joseph Leidy and J. Aitken Meigs. According to Leidy,[1] "after the death of Dr Morton, it was proposed to me to take up the investigation of the cranial characteristics of the human races, where he had left it, which I omitted, not from a want of interest in ethnographic science, but because other studies occupied my time. Having, as Curator of the Academy of Natural Sciences, the charge of Dr Morton's extensive cabinet of human crania, I confided the undertaking to Dr Meigs. . . ."

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[1] In Nott and Gliddon's *Indigenous Races of the Earth*, 8°, Phila., 1857, p. xvi.

Dr J. Aitken Meigs, eventually professor of climatology, physiology, and the institutes of medicine in various colleges of Philadelphia and an indefatigable worker,[1] endeavored with considerable success to pick up the threads where broken by Morton's death and in the course of sixteen years (1850–1866) contributed a number of good papers on anthropology. The most important of these were "The Cranial Characteristics of the Races of Men," in Nott and Gliddon (1857), with extensive bibliography; the *Catalogue of Human Crania in the Collection of the Academy of Natural Sciences of Philadelphia* (1857), a continuation of Morton's Catalogue, which meanwhile had reached the third edition; the *Observations on the Occiput in Various Races* (1860); the *Hints to Craniographers* (1858), which includes the first comprehensive data on other cranial collections then in existence, both here and in Europe; and the *Mensuration of the Human Skull* (1861), which, besides referring to much of the earlier history of anthropometry, gives clear directions for 48 cranial measurements and determinations.

In appraising Meigs' anthropological work as a whole, it is felt with regret that he was not all to the science that he could and should have been. His writings show much knowledge of the field, minute application, and considerable erudition, but they do not go far enough; they are only excellent by-products of a mind preoccupied in other though more or less related directions. Meigs also like Morton left no disciples.

The bibliography of his anthropological contributions is as follows:

Description of a deformed, fragmentary human skull, found in an ancient quarry-cave at Jerusalem; with an attempt to determine by its configuration alone the ethnical type to which it belongs. Proc. Acad. Nat. Sci. Phila., XI, 1850, pp. 262–280.

On Dr Morton's collection of human crania. Proc. Acad. Nat. Sci. Phila., 1855, p. 420.

Catalogue of human crania in the collection of the Academy of Natural Sciences of Philadelphia. Proc. Acad. Nat. Sci. Phila., 1856, Suppl.

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[1] Born at Philadelphia, 1829, died 1879. Biography by Geo. Hamilton in *Trans. Med. Soc. Pa.*, Phila., 1880, pp. 1–22. For other biographic notices see under Meigs in *Catalogue of the Library of the Surgeon General, U. S. A.*

The cranial characteristics of the races of men. In Nott and Gliddon's Indigenous Races of the Earth, 8°, Phila., 1857, pp. 203–352.

Hints to craniographers—upon the importance and feasibility of establishing some uniform system by which the collection and promulgation of craniological statistics, and the exchange of duplicate crania, may be provided. 8°, pp. 1–6, Phila. 1858 (?), with Proc. Acad. Nat. Sci. Phila. for 1858, and separately.

Observations upon the form of the occiput in the various races of men. Proc. Acad. Nat. Sci. Phila., XII, 1860, pp. 397–415.

The mensuration of the human skull. North-Amer. Med. Chirurg. Review, Sept., 1861, pp. 837–861.

Observations upon the cranial forms of the American aborigines, based upon specimens contained in the collection of the Academy of Natural Sciences of Phila. Proc. Acad. Nat. Sci. Phila., 1866, p. 197.

Description of a human skull in the collections of the Smithsonian Institution (from Rock Bluff, Ill.), Smithsonian Report for 1867, pp. 412–414.

Meanwhile Dr Joseph Leidy (1823–'91), later Professor of Anatomy in the University of Pennsylvania, Curator of the Academy of Natural Sciences, and a foremost naturalist, did not wholly abandon his interest in anthropology. As will be seen from the appended bibliography, he published a number of smaller contributions of more or less direct interest to the new science, all of which bear the mark of an able and conscientious observer. Among other things those of us who are more closely interested in human antiquity owe to him one of the earliest and clearest statements regarding the unreliability of the fossilization of bone as a criterion of antiquity. His words on this point are as follows:[1] "Bones of recent animals, when introduced into later deposits, may in many cases very soon assume the condition of the fossils belonging to those deposits. Fossilization, petrification, or lapidification is no positive indication of the relative age of the organic remains. . . ."

As well known, it was Professor Leidy to whom the fossil pelvic bone of Natchez and the variously petrified human bones from the west coast of Florida were submitted for examination, which resulted in the opinion that they were not necessarily of any great antiquity, though he was inclined to believe that the native American had "witnessed the declining existence of the Mastodon and

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[1] In his article on human paleontology, Nott and Gliddon's *Indigenous Races of the Earth*, 1857, p. xviii, footnote.

Megalonyx" on this continent, and that man was probably a companion in America of the latest prehistoric horse.

Among the more than five hundred published contributions to natural science by Leidy, the following are of interest to anthropology:

On the cranium of a New Hollander. Journ. & Proc. Acad. Nat. Sci. Phila., 1847, p. 217.

On the hair of a Hottentot boy. Jour. & Proc. Acad. Nat. Sci. Phila., 1848, p. 7.

Observations on the existence of the intermaxillary bone in the embryo of the human subject. Proc. Acad. Nat. Sci. Phila., IV, 1848–1849, pp. 145–147.

On a so-called fossil man. Proc. Acad. Nat. Sci. Phila., 1855, p. 340.

(On human paleontology.) In Nott and Gliddon's Indigenous Races of the Earth, 8°, Phila., 1857, pp. XXI–XIX.

On an acephalous child. Proc. Acad. Nat. Sci. Phila., 1858, p. 8.

On blood crystals. Proc. Acad. Nat. Sci. Phila., 1858, Biol. 9.

On the cause of monstrosities. Proc. Acad. Nat. Sci. Phila., 1858, Biol. 9.

On sections of the human cranium. Proc. Acad. Nat. Sci. Phila., 1858, Biol. 10.

Exhibition of the lower jaw of an aged man. Proc. Acad. Nat. Sci. Phila., 1870, p. 133.

On the reversed viscera of a human subject. Proc. Acad. Nat. Sci. Phila., 1870, p. 134.

Anomalies of the human skull. Proc. Acad. Nat. Sci. Phila., 1888, p. 273.

Notice of some fossil human bones. Trans. Wagner Free Institute of Science, Phila., 1889, II, pp. 9–12.

VI—J. C. NOTT AND GEORGE R. GLIDDON

Besides J. Aitken Meigs and Joseph Leidy, there were two other men who were closely associated with Morton in his anthropological work and who subsequently endeavored to fill at least a part of the void left by his death. They were Dr J. C. Nott, of Mobile, Alabama, and Mr George R. Gliddon of Philadelphia, formerly U. S. Consul at Cairo and a large contributor to Morton's cranial collections.

Aided in the beginning by Morton himself and supplementing their work by contributions from Agassiz, Leidy, Meigs, Usher, Patterson, and others, Nott and Gliddon published in 1854 a volume on the *Types of Mankind*, which by 1871 reached the tenth edition;

and in 1857 this was followed by a volume on the *Indigenous Races of the Earth,* which also had a large circulation.

The scope of these works, which exercised considerable influence on the public mind in the field they covered, can best be appreciated from an enumeration of their main sections, which were:

THE TYPES OF MANKIND"

Memoir of Samuel George Morton.

The natural provinces of the animal world and their relation to the different types of man, by Prof. L. Agassiz.

Geographical distribution of animals and the races of man.

Types of mankind.

Excerpts from Morton's unedited manuscripts on "The Size of the Brain in various Races and Families of Man"; and on "Origin of the Human Species."

Geology and paleontology in connection with human origins, by W. Usher, M.D.

Hybridity of animals viewed in connection with the natural history of mankind; and comparative anatomy of races, by J. C. Nott, M.D.

"INDIGENOUS RACES OF THE EARTH"

Contribution by Leidy on "Human Paleontology"; with a letter on "Primitive Diversity of the Races of Man" and "The Reliability of Philological Evidence," by L. Agassiz.

Distribution and classification of tongues, by Alfred Maury.

Iconographic researches on human races and their art, by Francis Pulszky.

The cranial characteristics of the races of man, by J. Arthur Meigs.

Acclimation; or the comparative influence of climate and endemic and epidemic diseases on the races of man, by J. C. Nott.

The Monogenist and the Poligenist, by George R. Gliddon.

It is to be regretted that these publications and particularly the *Types of Mankind* were strongly attached to the biblical traditions, more than three hundred pages of the later volume being devoted to efforts at harmonizing the results of the rising science with the biblical Genesis.

Another serious defect of the two works was a dearth of actual field or laboratory research. They bore on the whole the stamp of popular science rather than that of reports on scientific investigation. So they were evidently received and on that basis reached their extensive circulation. They have not advanced or benefitted physical anthropology in this country to any great extent, and are now but seldom referred to.

VII—ANTHROPOLOGY IN BOSTON—GEORGE PEABODY AND JEFFRIES WYMAN

It now becomes necessary to leave Philadelphia for a while and return to Boston. Toward the end of the first half of the last century there were living in Salem and Boston two men, George Peabody and Jeffries Wyman, who, directly or indirectly, were destined to become important factors in American anthropology. It was the former who, after extensive travels in both North and South America, and from personal appreciation of the problems awaiting archeology, ethnology, and physical anthropology on this continent, not only assisted his friend Jeffries Wyman, but established and endowed, besides other scientific foundations, the Peabody Museum of American Archaeology and Ethnology of Harvard University (1866), an institution which from the beginning has been of highly valued service to our science.

As to Jeffries Wyman, his services to American anthropology can not be passed over with only a brief notice.

Wyman was born at Chelmsford, Massachusetts, August 11, 1814. He studied at Harvard, and in 1837 graduated in medicine. Finding difficulty in securing a favorable opportunity for practice, he became Demonstrator of Anatomy at Harvard College; but his earnings were so small that to eke out his subsistence he was obliged at the same time to become a member of the Boston fire department.[1] In 1840, however, he was appointed Curator of the Lowell Institute. In 1840–1841 he delivered at the Institute his well-known course of twelve lectures on comparative anatomy and physiology, and with the money thus earned went to Europe for further studies. At Paris he devoted himself to comparative anatomy and physiology, and here in all probability he also became acquainted more directly with the beginnings of physical anthropology. In 1843 he accepted the chair of anatomy and physiology at Hampden-Sidney College, Virginia; and in 1847 he was appointed to succeed Doctor Warren as Hersey Professor of Anatomy at Harvard College.

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[1] Asa Gray: *Jeffries Wyman. Memorial Meeting of the Boston Society of Nat. History, Oct. 1, 1874*, 8°, pp. 1–37. Also Memoir of Jeffries Wyman by A. S. Packard, *Nat. Acad. Sci.*, pub. 1878, pp. 75–126.

In 1852 Jeffries Wyman began, on the occasion of a necessary trip to the South for his health, an exploration of the shell-mounds in Florida. In 1856 he penetrated deep into Surinam, and two years later traveled extensively with George A. Peabody through Argentina, across the Andes to Chile, and back by way of Peru and Panamá. In 1866, when "failing strength demanded a respite from oral teaching," he was named by George Peabody one of the seven trustees of the newly founded Peabody Museum, at the same time becoming the first Professor of American Archeology and Ethnology at Harvard University and a curator of the museum.

Long before his connection with the Peabody Museum, Wyman began to assemble collections in comparative anatomy, including some human material; and while a curator of the museum he brought together an important collection of human crania, the foundation of the present large somatological collections of that institution.

Wyman died of pulmonary hemorrhage September 4, 1874. He left no great published works, but a large number of valuable smaller contributions, many of which relate to or deal directly with anthropology. He gave us our first precise osteological knowledge of the gorilla; he investigated most conscientiously the human crania at the Peabody Museum, and extended his studies to the bones of the limbs, pointing out for the first time the prevalence of platycnemy in the Indian; he gave an excellent description of the shell-heaps of Florida and their human skeletal remains; and was at the time of his death "undisputably the leading anthropologist of America" (Packard).

That the premature demise of Jeffries Wyman was a great loss to our branch of science will be seen from the following list of publications showing his anthropological and related activities:

Observations on the external characters, habits, and organization of the *Troglodytes niger*, Geof. Boston Jour. Nat. Hist., IV, 1843–1844, pp. 362–376, 377–386.

Notice of the external characters, habits, and osteology of *Troglodytes gorilla*, a new species of ourang from the Gaboon river. Boston Jour. Nat. Hist., V, 1845–1847, pp. 417–422; Ann. Sci. Nat., XVI (Zool.), 1851, pp. 176–182; Proc. Boston Nat. Hist. Soc., II, 1845–1848, pp. 245–248; Amer. Jour. Sci., VIII, 1849, pp. 141–142.

A new species of Troglodytes. Silliman's Jour., v, 1848, pp. 106–107.

A description of two additional crania of the *engé-ena* (*Troglodytes gorilla*, Savage and Wyman) from Gaboon, Africa (1849). Proc. Boston Soc. Nat. Hist., III, 1848–51, p. 179; Amer. Jour. Sci., IX, 1850, pp. 34–45; New Phil. Journ. Edinb., XLVIII, 1850, pp. 273–286.

On the crania of Indians. Proc. Boston Soc. Nat. Hist., IV, 1851–1854, pp. 83–84.

Description of the post-mortem appearances in the case of Daniel Webster. American Jour. Med. Sci., Jan., 1853.

Dissection of a black Chimpanzee (*Troglodytes niger*). Proc. Boston Soc. Nat. Hist., v, 1854–56, pp. 274–275.

On the cancellated structure of some of the bones of the human body (1849). Jour. Boston Soc. Nat. Hist., VI, 1857, pp. 125–140.

Account of the dissection of a human foetus. Proc. Bost. Soc. Nat. Hist., Feb. 3, 1858.

Account of the collection of gorillas made by Mr Du Chaillu. Proc. Bost. Soc. Nat. Hist., Jan. 4, 1860.

On bones of a gorilla recently obtained in western equatorial Africa. Proc. Bost. Soc. Nat. Hist., Oct. 2, 1861.

Dissection of a Hottentot. Proc. Bost. Soc. Nat. Hist., April 2, 1862.

On the development of the human embryo. Proc. Bost. Soc. Nat. Hist., Dec. 3, 1862.

Observations on the cranium of a young gorilla. Proc. Boston Soc. Nat. Hist., IV, 1863, pp. 203–206.

On the skeleton of a Hottentot (1863). Proc. Bost. Soc. Nat. Hist., IX, 1865, pp. 352–357; Anthropol. Review, III, 1865, pp. 330–335.

On malformations. Proc. Bost. Soc. Nat. Hist., Oct. 19, 1864.

On Indian mounds of the Atlantic coast. Proc. Bost. Soc. Nat. Hist., Nov. 2, 1864.

On the distorted skull of a child from the Hawaiian islands. Proc. Bost. Soc. Nat. Hist., Oct. 17, 1866.

Measurements of some human crania. Proc. Bost. Soc. Nat. Hist., Nov. 20, 1867.

On symmetry and homology in limbs (1867). Proc. Bost. Soc. Nat. Hist., XI, 1868, pp. 246–278.

Observations on crania. Proc. Bost. Soc. Nat. Hist., XI, 1868, pp. 440–462. Also Observations on crania and other parts of the skeleton. Fourth Annual Report of the Peabody Museum, 1871, pp. 10–24.

On the fresh-water shell heaps of the St. John's river, East Florida. American Naturalist, II, 1869, pp. 393–403, 449–463.

Human remains in the shell heaps of the St. John's river, East Florida. Cannibalism. American Naturalist, VIII, p. 403–414, July 1, 1874; also 7th Ann. Report of Peabody Museum, I, 1874, pp. 26–37.

Remarks on cannibalism among the American aborigines. Proc. Bost. Soc. Nat. Hist., May 20, 1874.

Fresh-water shell mounds of the St. John's river, Florida; Fourth memoir. Peabody Academy of Science, Salem, Mass., 1875, pp. 94, pl. I–IX.

VIII—Later History of Anthropology

After Wyman, the history of physical anthropology in Boston, and later also in Worcester, Mass., is one that belongs, with two notable exceptions, to the realm of the living, headed by one of the best friends the science has ever had in this country, Prof. F. W. Putnam. The two exceptions apply to Henry P. Bowditch and Frank Russell.

Dr Henry P. Bowditch (1840–1911), Professor of Physiology in the Harvard Medical School, has left us, besides his physiological writings, a number of direct contributions to physical anthropology, some of which are of great value. The most noteworthy ones were those reporting his investigations on the growth of children. These investigations, undertaken in the early seventies under the auspices of the Health Department of the Social Science Association of Boston, were stimulated by the results of researches on Belgian children published in Quetelet's *Anthropometrie* (Brussels, 1870). Their final object was "to determine the rate of growth of the human race under the conditions which Boston presented." The results contributed much to our knowledge of the laws controlling the growth of the child, and stimulated in turn all later investigations on the subject in this country.

Other contributions of Professor Bowditch to anthropology are included in the following bibliography:

The growth of children. 8th Ann. Rep. State Bd. Health of Mass., Boston, 1877, pp. 1–51.

The growth of children. (A supplementary investigation) with suggestions in regard to methods of research. 10th Ann. Rep. State Bd. Health of Mass., Boston, 1879, pp. 35–62.

Relation between growth and disease. Trans. Am. Med. Asso., 1881, 9 pp.

The physique of women in Massachusetts. 21st Ann. Rep. State Board of Health of Mass., Boston, 1889–90; Also in Med. Pub. Harvard Med. Sch., 20 pp., 1 table.

The growth of children, studied by Galton's method of percentile grades. 22d Ann. Rep. State Bd. Health, Mass., Boston, 1891, pp. 479–522.

Are composite photographs typical pictures? McClure's Mag., N. Y., 1894, 331–342.

Frank Russell, Ph.D. (1868–1903), was unfortunately taken away too soon to be able to accomplish much for our branch of science. He was Instructor in Anthropology in Harvard University and was in charge of the anthropological laboratory of the Peabody Museum. In 1901 he also became associated temporarily with the Bureau of American Ethnology. He carried on explorations, partly anthropological and partly ethnological, among the tribes in northern Canada and among the Pima of Arizona, and published several contributions on craniological work in the laboratory. He succumbed to tuberculosis before his work could leave a lasting impress on American anthropology. Following is a list of his writings which bear more or less on our subject:

Explorations in the Far North, 8°, 290 pp., 1898 (expeditions under the auspices of the University of Iowa, 1892–3–4).

Human remains from the Trenton gravels. Am. Naturalist, 1899, p. 33.

Studies in cranial variation. Am. Nat., 1900, pp. 737–745.

New instrument for measuring torsion. Am. Nat., 1901, No. 412.

Laboratory outlines for use in somatology. Am. Anthropologist, v, 1901, p. 3.

Before we turn again southward, a few words are due to Canada.

In 1862 Sir Daniel Wilson (1816–1892), Professor of History and English Literature in University College, Toronto, published two volumes on *Prehistoric Man*, the second of which is devoted largely to notes and measurements, many of them original with the author, on Mound, Peruvian, Mexican, and other American crania, including a nice series (39 male, 18 female) of those of the Hurons, besides a valuable series (39 skulls) of the Eskimo. To the description of the crania is added a chapter on "Racial Cranial Distortion," and other chapters on "The Indian of the West," "Intrusive Races," and "Migrations."

Besides his *Prehistoric Man*, which reached three editions, Sir Daniel Wilson published a number of articles touching more or less directly on physical anthropology, the principal of which are:

Ethnical forms and undesigned artificial distortions of the human cranium. Canad. Jour., 1862, pp. 399–446; also sep., 8°, Toronto, 48 pp., 3 pl.

Brain-weight and size in relation to relative capacity of races. Canad. Journ., 1876, pp. 177–230; also sep., 8°, Toronto, 56 pp.

Anthropology, 8°, N. Y., 1885, 55 pp.

The right hand: left handedness. 12°, London and N. Y., 1891, x, 215 pp.

It is regrettable, from the scientific point of view, that most of these writings, while of considerable contemporary value, were somewhat general in nature, lacking in a measure the impress of the hand of the specially trained anatomist and anthropologist, hence they left no substantial, enduring impression on the progress of physical anthropology. The measurements on the crania, particularly, were few in number, recorded in inches, and taken with instruments regarding which there is no record, though presumably they were such as had been used by Meigs and Morton. The skulls utilized by Wilson were largely those of the Boston and Philadelphia collections in Quebec, and probably also from the collection now in the Provincial Museum at Toronto.

Proceeding southward from Boston and Toronto we find that, in New York, the old Ethnological Society had gone out of existence. A number of medical collections, including anthropological specimens, were being formed in connection with several of the hospitals and colleges, but resulted in nothing of importance to our science. The American Museum of Natural History was not established until 1869, and had not seriously begun its valuable collections or research in physical anthropology until well toward the end of the century.

West of New York, also, some collections of Indian crania were begun in the earlier part of the second half of the nineteenth century —particularly in Chicago, where there also appeared, between 1867 and 1873, a number of publications touching on the physical anthropology of the American race, by J. W. Foster, the geologist (1815–1873).[1] Unfortunately none of these publications, so far as they deal with somatology, are of great value.

In coming back to Philadelphia, we see that the old Wistar and Horner Museum (founded 1808) has been enriched by anthropological material;[2] and there are rising from the same medical ranks which have already given us Morton, Meigs, and Leidy in that city, two new men who, particularly in one case, were to become of considerable importance to physical anthropology. They are Dr Harrison Allen (1841–'97), and Dr Daniel G. Brinton (1837–'99).

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[1] On the Antiquity of Man in North America, *Trans. Acad. Sci.*, I, Chicago, 1867–69, pp. 227–257. On Certain Peculiarities in the Crania of the Mound-builders, *Proc. Am. Asso. Adv. Sci.*, XXI, 1872, 227–255; *American Naturalist*, VI, 1872, 738–747. *Prehistoric Races of the United States of America*, 8°, Chicago, 1873, pp. XV, 415.

[2] Destined eventually to become a part of the collections of the Wistar Institute of Anatomy and Biology, incorporated in 1892.

Dr Harrison Allen was born in Philadelphia in 18—. Like Morton he was deprived, by untoward circumstances, of preliminary higher education. In a large measure self-taught, he matriculated in 1859 in the medical department of the University of Pennsylvania and was graduated in 1861. From the latter date to 1865 he served as physician or surgeon in various city and army hospitals at Philadelphia and about Washington. At the close of 1865, resigning from the army service, he returned to Philadelphia to attend on the one hand to practice, and on the other to anatomical, anthropological, and biological investigation. Soon after he was offered the position of Professor of Zoölogy and Comparative Anatomy in the Auxiliary Faculty of Medicine in the University of Pennsylvania,[1] which he held for many years. Later he was also for a time Professor of Institutes (mainly physiology) at the University; the chair of anatomy was occupied by Leidy. In 1892 he was elected President of the Association of American Anatomists, and shortly after became the first Director of the Wistar Institute.

Judging from his anthropological writings, Harrison Allen became interested in this branch of science primarily through the works of Morton and J. Aitken Meigs, the latter of whom he knew personally; in large measure, however, he also followed the more modern English craniologists.

The number of his anthropological contributions is large, as will be seen from the appended register; but in many instances it is to be regretted that the title covers merely a note on a more or less extended oral communication, the publication of which in full would have been of much interest.

Allen's three most important contributions to physical anthropology are *The Clinical Study of the Skull* (1890); *The Crania from*

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[1] *Memoir of Harrison Allen, M.D.*, by Horatio C. Wood, M.D.; read April 6, 1898; 8°, Phila. 1898, pp. 1–15. This memoir, as well as the appended bibliography, are, however, defective.

the Mounds of the St. John's River, Florida (1896); and *The Study of Hawaiian Skulls* (1898; finished just before his death). These works are accompanied by excellent illustrations; the measurements and special observations are much more detailed than in any previous American work; the whole treatment of the subjects shows much erudition; and the works compare favorably with any anthropological memoirs published to that date abroad.

The *Clinical Study of the Skull* was the tenth of the Toner Lectures of the Smithsonian Institution: lectures "instituted to encourage the discovery of new truths for the advancement of medicine." It was delivered May 29th, 1889, and printed a year later. Notwithstanding its medical title, it is strictly an anthropological publication which deals with many features and anomalies of racial skulls, that had scarcely been noticed up to that time, as will be apparent from the following subdivisions of the essay: 1, the malar bone; 2, the lower jaw; 3, the norma basilaris; 4, the basi-cranial angle; 5, the posterula; 6, the nasal chambers; 7, the vertex—its sutures, eminences, depressions, general shape, etc.; and 8, sutures other than those of the vertex.

The memoir on *Crania from the Mounds of the St. John's River* calls attention for the first time to the highly deserving series of archeological explorations, with their accompanying anthropological collections, carried on to this day by Mr Clarence B. Moore. Comparative measurements and observations are given on a considerable number of other American skulls from Alaska to California. The results of several interesting new measurements are shown; and included are reports on complete and incomplete divisions of the malar bone, on various features of the condyloid process of the lower jaw, on senile absorption, and on numerous interesting morphological characteristics of the teeth.

The final larger anthropological contribution of Harrison Allen, that on Hawaiian skulls, is really a modern production, which gives valuable detailed measurements; shows a novel method of graphic representation of the numerical data and contrast of series; and, like the works previously mentioned, includes many interesting collateral observations, such as those on prenasal fossæ, the lower jaw, the infra-orbital suture, the hard palate, the teeth and their effect on skull form, the premature closure of sutures, and various pathological conditions.

Besides the above, there are a number of articles by Harrison Allen, the true contents of which are more or less obscured, or imperfectly expressed by their titles, and which are of considerable interest to the anthropologist. They are "The Jaw of Moulin Quignon" (1867); "Localization of Diseased Action in the Osseous System" (1870); "On Certain Peculiarities in the Construction of the Orbit" (1870); "On the Methods of Study of the Crowns of the Human Teeth" (1888); and "On the Effects of Disease and Senility in the Bones and Teeth of Mammals."

Considering the excellence of Harrison Allen's contributions to anthropology and the unquestionable fact that he, after Morton, stands as the foremost American representative of our branch of science on this continent before the end of the nineteenth century, it might seem strange that his influence on the development of the science remained only moderate. The explanation of this lies doubtless in the facts that he did not devote himself exclusively to physical anthropology, but by many was regarded rather as a biologist or anatomist; that except for the few years before his death, when he held the directorship of the Wistar Institute, he was not connected in a higher capacity with any museum or institution, and made no noteworthy collections. Also he never engaged in the teaching of anthropology; and his publications in this line, while altogether of a respectable number and volume, were nevertheless, when taken individually, often far apart, disconnected, and mostly quite brief. A list of his writings follows:

[The Third Condyle in Man.] Proc. Acad. Nat. Sci. Phila., 1867, p. 137.

The Jaw of Moulin Quignon. Dental Cosmos, IX, Phila., 1867, pp. 169–180.

On the inter-orbital space in the human skull. Proc. Acad. Nat. Sci. Phila., 1869, Biol. 13.

Localization of diseased action in the osseous system. Am. Jour. Med. Sci., 1870, pp. 401–409.

On certain peculiarities in the construction of the orbit. Am. Jour. Med. Sci., N. S., LXIX, Phila., 1870, 116–119.

Life-form in art. 4°, Phila., 1875, 70 pp.

On the effect of the bipedal position in man. Proc. Acad. Nat. Sci. Phila., 1875, pp. 468–469.

Autopsy of the Siamese Twins. Trans. Coll. Physicians Phila., VIII, Phila., 1875, pp. 21–42.

A human skull exhibiting unusual features. Proc. Acad. Nat. Sci. Phila., 1876, pp. 17–18 (Pterygo-sphenoid process).

Distinctive characters of teeth. Proc. Acad. Nat. Sci. Phila., 1878, p. 39, note.

Asymmetry of the turbinated bones in man. Proc. Acad. Nat. Sci. Phila., 1882, pp. 239–240.

Irregularities of the dental arch. Proc. Acad. Nat. Sci. Phila., 1882, p. 310.

Asymmetry of the nasal chambers without septal deviation. Arch. of Laryngol., IV, 1883, 256–257.

On the methods of study of the crowns of the human teeth, including their variations. Dental Cosmos, XXX, Phila., 1888, pp. 376–379.

On hyperostosis of the premaxillary portion of the nasal septum, etc. Medical News, LVII, Phila., 1890, pp. 183–186.

The influence exerted by the tongue on the positions of the teeth. Proc. Acad. Nat. Sci. Phila., 1891, p. 451.

On the bipartite malar in the American Indian. Proc. Asso. Am. Anatomists for 1888–1890, Wash., 1891, p. 16.

The forms of edentulous jaws in the human subject. Proc. Acad. Nat. Sci. Phila., 1893, pp. 11–13.

Congenital defects of the face. N. Y. Med. Jour., LVIII, 1893, pp. 759–760.

Hyperostosis on the inner side of the human lower jaw. Proc. Acad. Nat. Sci. Phila., 1894, pp. 182–183.

The changes which take place in the skull coincident with shortening of the face-axis. Proc. Acad. Nat. Sci. Phila., 1894, pp. 181–182.

Pithecanthropus erectus. Science, N. S., I, 1895, pp. 239–240, 299.

The classification of skulls. Science, N. S., I, 1895, p. 381.

Demonstration of skulls showing the effects of cretinism on the shape of the nasal chambers. N. Y. Med. Jour., LXI, 1895, pp. 139–140.

Note on a uniform plan of describing the human skull. Proc. Asso. Am. Anat., 8th session, 1895, pp. 65–68; also in Proc. Acad. Nat. Sci. Phila., 1896, pp. 170–174.

On the effects of disease and senility as illustrated in the bones and teeth of mammals. Science, N. S., V, 1897, pp. 289–294. German translation in *Rundschau.*

Study of skulls from the Hawaiian islands. With an introduction by D. G. Brinton. Wagner Institute. Proc. Acad. Nat. Sci. Phila., V, pp. 1–55, 12 plates, 1898.

The second student mentioned at the beginning of this section was Daniel G. Brinton. Of widely different personality from that of Harrison Allen, his services to physical anthropology were also of quite a different character.

Doctor Brinton was graduated from Yale; he received his medical degree in 1860 at the Jefferson Medical College in Philadelphia, and had traveled in Europe. He served through the Civil War in his medical capacity, but toward the end of 1865 he returned to West Chester, thence to Philadelphia, where he practised medicine and became editor of *The Medical and Surgical Reporter*, which position he held until 1887.[1] Eventually he became Professor of Ethnology and Archeology in The Academy of Natural Sciences of Philadelphia, Professor of American Linguistics and Archeology in the University of Pennsylvania, and Curator of the American Philosophical Society collections.

Brinton's interest in anthropology dated probably from his childhood, and extended to all branches of the science, including somatology. Like Harrison Allen, he came but little in direct contact with the American tribes, in whom nevertheless all his interests centered; but unlike Allen he was much more a student than a laboratory man or a practical anatomist. Allen and Brinton associated, however, as friends, and each doubtless exercised an influence on the other's thought and scientific production.

Among the numerous publications of Brinton relating to anthropological subjects, more than thirty are of more or less direct interest to physical anthropology (see appended bibliography). Of these the large majority are of a documentary or general nature, the more noteworthy being *The Floridian Peninsula* (1859); *The Moundbuilders* (1881); *Races and Peoples* (1890); and *The American Race* (1891). Among his special articles, those deserving more particular notice, are that on "Anthropology, as a Science and as a Branch of University Education in the United States" (1892); "On Certain Indian Skulls from Burial Mounds in Missouri" (1892); "On the Variations of the Human Skeleton and other Causes" (1894); "On the Aims of Anthropology" (1895); and "On the Factors of Heredity and Environment" (1898).

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[1] For further details see *Report of the Brinton Memorial meeting*, 8°, Phila., 1900, pp. 67.

In glancing over these publications the student of physical anthropology will find many useful data and much that is helpful; but here and there he will also come across a bowlder in the path which it will be necessary to remove and the traces of which in some cases will long be perceptible. Among the most helpful were Brinton's articles on the mound-builders, counteracting the old prevalent opinion that there had existed a separate mound-builder race distinct from the rest of the Indians. Among his opinions which it would be hard to accept today were that the Eskimo extended far to the south of their present eastern abode; the probability of the derivation of the American race at the close of the last glacial epoch from Europe; and his correspondingly antagonistic attitude toward the theory of Asiatic derivation of the Indians.

Doctor Brinton excelled as a critic and in discussion; and notwithstanding a lack of sufficient specialization in physical anthropology, his activities exercised a favorable influence on the progress of the science in common with other branches of anthropology. Dr Brinton's bibliography relating more or less to somatology follows:

The Floridian peninsula, its literary history, Indian tribes and antiquities· 8°, pp. 202, Philadelphia, 1859.

The Shawnees and their migrations. Historical Magazine, x, pp. 1–4, Jan., 1866 (Morrisania, New York).

The Mound-builders of the Mississippi valley. Historical Magazine, xi, pp. 33–37, Feb., 1866.

The probable nationality of the mound-builders. American Antiquarian, iv, pp. 9–18, Oct., 1881.

Anthropology and ethnology. pp. 184. Iconographic Encyclopedia, i, pp. 1–184, Phila., 1886.

A review of the data for the study of the prehistoric chronology of America. Pp. 21. Proc. Amer. Assoc. for the Advancement of Science, 1887.

On an ancient human footprint from Nicaragua. Proc. Amer. Philos. Soc., xxiv, pp. 437–444, Nov., 1887.

On a limonite human vertebra from Florida. Proc. Amer. Assoc. Adv. Sci., 1888.

On the alleged Mongoloid affinities of the American race. Proc. Amer. Asso. Adv. Sci., xxvii, p. 325, 1888.

The cradle of the Semites. A paper read before the Philadelphia Oriental Club. Pp. 26, Phila., 1890.

Races and peoples; Lectures on the science of ethnography. 12°, N.Y., 1890, 313 pp., 5 maps.

Essays of an Americanist. I, Ethnologic and Archaeologic. Illus., 8°, Phila., 1890.

Folk-lore of the bones. Jour. Amer. Folk-lore, III, pp. 17–22, Jan. 1890.

The American race: A linguistic classification and the ethnographic description of the native tribes of North and South America. Pp. 392. New York, 1891.

Current notes on anthropology. Science, New York, 1892.

Anthropology as a science and as a branch of university education in the United States. Pp. 15. Phila., 1892.

The nomenclature and teaching of anthropology. American Anthropologist, V, pp. 263–271, July, 1892.

Remarks on certain Indian skulls from burial mounds in Missouri, Illinois and Wisconsin. Trans. of the Coll. of Physicians, Phila., third series, XIV, pp. 217–219, Nov., 1892.

European origin of the white race. Science, XIX, p. 360, June, 1892.

Proposed classification and international nomenclature of the anthropologic sciences. Proc. Amer. Assoc. Adv. Sci., XLI, pp. 257–258, 1892.

The African race in America. Chambers' Cyclopedia, new edition, VII, London and Phila., 1893, pp. 428–430. Article "Negroes."

The beginnings of man and the age of the race. The Forum, XVI, pp. 452–458, December, 1893.

Variations of the human skeleton and their causes. Amer. Anthropologist, VII, pp. 377–386, Oct., 1894.

On various supposed relations between the American and Asian races. Memoirs of the International Congress of Anthropology, Chicago, 1894, pp. 145–151.

The "nation" as an element in anthropology. Memoirs of the International Congress of Anthropology, Chicago, 1894, pp. 19–34.

The aims of anthropology. Proc. Amer. Assoc. Adv. Sci., XLIV, pp. 1–17, 1895.

Left-handedness in North American aboriginal art. Amer. Anthropologist, IX, pp. 175–181, May, 1896.

The relations of race and culture to degenerations of the reproductive organs and functions in women. Medical News, N. Y., Jan. 18, 1896, pp. 68–69.

On the remains of foreigners discovered in Egypt by Mr. Flinders Petrie, 1895. Proc. Amer. Philosophical Soc., XXXV, pp. 63–64, Jan., 1896.

Dr Allen's contributions to anthropology. Proc. Acad. Nat. Sci. Phila., December, 1897, pp. 522–529.

The factors of heredity and environment in man. Amer. Anthropologist, XI, pp. 271–277, September, 1898.

The dwarf tribe of the upper Amazon. Amer. Anthropologist, XI, pp. 277–279, Sept., 1898.

The Peoples of the Philippines. Amer. Anthropologist, XI, pp. 293–307, Oct., 1898.

IX—HISTORY OF ANTHROPOLOGY IN WASHINGTON

Again leaving Philadelphia, further tracing of the earlier history of physical anthropology in the English speaking countries of this continent leads us to Washington and to the various Government exploring expeditions, to certain corporate bodies associated with the United States Government, and finally to Government institutions proper.

The earliest event of importance to physical anthropology in Washington of which any records exist, was the gathering of Indian and other crania made by the United States Exploring Expedition of 1838–1842. No concrete record seems to exist showing exactly what this collection comprised. It was deposited with the National Institute (1840–1862), a society with a strong Government affiliation. In 1841 this society was granted the use of quarters in the Patent Office building for its collections, and those of the Government were confined to its care; and in these, we are told, natural history and ethnology predominated.[1] According to a catalogue of the collections of the National Institute, by Alfred Hunter (second edition, 1855), the anthropological material in the Institute at that time comprised an "Ancient skull"; "A very superior collection of human crania, many of them collected by the United States Exploring Expedition from the Pacific Islands"; "A skull from the Columbia river"; "Skull of a Chenook Chief"; four skulls "from an ancient cemetery"; a "Mummy from Oregon"; "Two tatooed heads from Fiji"; "Peruvian mummies"; "Two Egyptian mummies"; "The skull and paws of a chimpanzee"; and numerous busts in plaster of distinguished persons. These collections remained in the Patent Office in part until 1858 and in part until 1862, when they were transferred to the Smithsonian Institution.

The Smithsonian Institution was established in 1846, under the terms of the will of James Smithson, who bequeathed his fortune in 1826 to the United States for the "increase and diffusion of knowledge among men."[2] From the income of the fund the present

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[1] See Richard Rathbun: The National Gallery of Art, *Bull. 70, U. S. National Museum*, Wash., 1909, p. 25 et seq.

[2] *The Smithsonian Institution, at Washington*, etc., Washington, 1907; also, *The Smithsonian Institution; documents relative to its origin and history*, by Wm. J. Rhees, Washington, 1879, pp. 1027.

Smithsonian building was erected on land given by the United States, and on its completion in 1858 a large part of the collections assembled under the auspices of the Government up to that time were assigned to the custody of the Institution. The National Institute passed out of existence in 1862.

In 1863 the Smithsonian Institution collections were partly destroyed by fire,[1] but the anthropological part fortunately escaped.

In 1866 another establishment was founded in Washington which was destined to render a great service to physical anthropology. This was the Army Medical Museum. Almost from the first close relations were established with the Smithsonian Institution, involving exchange of specimens; and on January 16, 1869, a formal arrangement was entered into between Secretary Henry, for the Smithsonian Institution, and Dr George A. Otis, curator of the Army Medical Museum, for the transfer thenceforth from that Museum to the Smithsonian Institution of all ethnological and archeological articles that were then in the Medical Museum or might be received in the future, in return for which the Museum received and was to receive thenceforth all human skeletal material. The actual number of crania then transferred does not appear in the records, but the collection must already have been of some importance; and in the following years hundreds of specimens of similar nature were received by the Museum from the Smithsonian. In addition, letters and circulars were sent out by Doctor Otis to Army and Navy surgeons as well as to other persons, and through this medium the Army Medical Museum anthropological collections grew until, in 1873, they included approximately sixteen hundred crania of American aborigines and other races.[2]

About 1870, or shortly after, a series of measurements were undertaken on the crania in the Army Medical Museum collection under Doctor Otis's direction; and in 1876 and again in 1880 a "Check-List" was published by Doctor Otis, the later edition including records on more than two thousand human crania and skeletons from many parts of the world. Unfortunately the majority of the measurements were made by an unscientific employee and with instruments less perfect than those now in anthropometric use, with the consequence that many of the determinations have since been found by remeasurement of the specimens to be more or less inaccurate, and the catalogue on that account can not be used with any degree of confidence.

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[1] See *Annual Report of the Smithsonian Institution*, 1864, p. 117, et seq.

[2] A detailed account of the services of the Army Medical Museum to American anthropology is being prepared by Dr D. S. Lamb of the Museum.

After Doctor Otis's death in 1881 the anthropological studies suffered a temporary set-back, but were stimulated again in 1884 when Dr J. S. Billings, U. S. Army, became Curator of the Museum. As a result of Doctor Billings' interest in anthropological work it was taken up by another United States army surgeon, namely Dr Washington Matthews.

Before this, however, two important publications of much direct interest to physical anthropology were made possible by investigations conducted in connection with the United States Army and were published in New York and Washington. The first was Dr B. A. Gould's, *The Military and Anthropological Statistics of the War of the Rebellion*, 8°, New York, 1865; the second was *Statistics, Medical and Anthropological, of the Provost-marshal-general's Bureau*, two volumes, 4°, 1875.

Both of these works deal with statistical data and observations obtained on Northern recruits during the Civil War, and represent the first efforts of note on this continent in anthropology of the living, the records extending to many thousands of subjects. The data were secured by medical examiners and other physicians. Unfortunately the work was carried out under unfavorable circumstances, and by men many of whom had no previous knowledge of these matters and who received no instruction except by circulars. The records in consequence, while interesting, can not be regarded as sufficiently reliable for the present demands of anthropology. In a number of instances, as in the reports on certain physiological observations on the "Indians" enlisted in the army, the results, in view of our subsequent information on these subjects, are so inaccurate as to be quite useless.

Dr Washington Matthews (1843–1905), to whom we may now return, while known to science mainly for his contributions to Hidatsa and Navaho ethnology, was nevertheless interested considerably and directly in physical anthropology. In the Army Medical Museum, and in part with Doctor Billings, he carried on and published the results of investigations on the measurement of the cranial capacity, on composite photography and appliances for the same, on several modifications of anthropometric instruments, and on anatomical and anthropological characteristics of Indian crania, particularly those of the ancient Pueblos collected by the Hemenway Expedition.

The Hemenway Expedition was fitted out in 1886 under the direction of Frank Hamilton Cushing, with funds supplied by Mrs Mary Hemenway of Boston, for exploring certain ruins of the Gila drainage in Arizona. While the work was fairly under way, Dr J. L. Wortman, at that time the anatomist of the Army Medical Museum, visited the excavations in the Salt River valley at the instance of Mr Cushing and Dr Matthews, and obtained a large collection of the fragile skeletal remains of the ancient Pueblos, which was forwarded to the Museum. Here they were eventually studied by Matthews and Wortman and the results were published in a quarto memoir[1] which forms a contribution of lasting value to physical anthropology and a worthy companion to Allen's *Crania of the St. John's River*.

Doctor Matthews, a personal friend of the writer, was interested in physical anthropology to the close of his life; but advancing illness obliged him for several years before his death to abandon active work in that direction. Shortly before his death he was partly instrumental in the final stage of retransfer of the anthropological collections from the Army Medical Museum to the Smithsonian Institution; and he left hundreds of drawings and records on parts of these collections. Doctor Matthews' contributions to physical anthropology were as follows:[2]

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[1] The human bones of the Hemenway collection in the U. S. Army Medical Museum at Washington, by Dr Washington Matthews, surgeon U. S. Army; "with observations on the Hyoid bones of this collection, by Dr J .L. Wortman. *Seventh Memoir of the National Academy of Sciences*, Washington, 1891, pp. 141–286, plates 1–59.

[2] For other publications and a biographical sketch, see Mooney, J., in *American Anthropologist*, N. S., VII, no. 3, 1905, pp. 514–523.

The curvature of the skull. Trans. Anthr. Soc. Wash., III, pp. 171–172, Wash., 1885.

On composite photography as applied to craniology, by J. S. Billings; and on measuring the cubic capacity of skulls, by Washington Matthews. Read April 22, 1885. Mem. Nat. Acad. Sci., III, pt. 2, 13th mem., pp. 103–116, 19 pl., Wash., 1886.

On a new craniophore for use in making composite photographs of skulls, by John S. Billings and Washington Matthews. Read Nov. 12, 1885. Mem. Nat. Acad. Sci., III, pt. 2, 14th mem., pp. 117–119, 4 pl., Wash., 1886.

Apparatus for tracing orthogonal projections of the skull in the U. S. Army Medical Museum. J. Anat. and Physiol., XXI, pp. 43–45, 1 pl., Edinb., 1886.

An apparatus for determining the angle of torsion of the humerus. J. Anat. and Physiol., XXI, p. 43–45, 1 pl., Edinb., 1886.

The study of consumption among the Indians. N. Y. Med. Jour., July 30, 1887.

A further contribution to the study of consumption among the Indians. Trans. Am. Climatol. Assoc., Washington meeting, Sept. 18–20, 1888, p. 136–155, Phila., 1888.

The Inca bone and kindred formations among the ancient Arizonians. Am. Anthropologist, II, pp. 337–345, Wash., Oct., 1889.

Human bones of the Hemenway collection in the U. S. Army Medical Museum. Mem. Nat. Acad. Sci., VI, 7th mem., pp. 139–286, 57 pl., Wash., 1893.

Use of rubber bags in gauging cranial capacity. Am. Anthropologist, XI, pp. 171–176, Wash., June, 1898.

We may now return to the Smithsonian Institution. While conditions during a larger part of the second half of the 19th century were not propitious for active participation by the Institution in anthropological research, nevertheless its publications, as will be seen from the bibliography, included many anthropological contributions by writers both foreign and American.

In 1872 Professor Otis T. Mason became connected with the Institution as collaborator in ethnology.

In 1879, the collections of the Institution increasing, Congress authorized the erection of a separate building for the National Museum, which was completed in 1881. In 1884 Professor Mason became curator of the Department of Ethnology in the Museum, and for almost a quarter of a century he was active in this position with abundant results.[1]

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[1] See Otis Tufton Mason, by Walter Hough, *American Anthropologist*, X, 1908, pp. 661–667.

While above all an ethnologist (in the American sense of the word), and while from a deep religious sentiment rather averse to the doctrine of man's evolution, Professor Mason was nevertheless one of the warmest friends of physical anthropology; and his helpful hand was in no small measure responsible for the subsequent auspicious development of the Division of Physical Anthropology in the U. S. National Museum.

Furthermore, somatology benefitted also directly from Professor Mason's scientific contributions. After Squier[1] and Fletcher,[2] he described one of the earliest known examples of Peruvian trephining;[3] he had printed for distribution the best contemporaneous classification of the human races; and several of his papers,[4] with his very useful annual contribution to anthropological bibliography, were of real service to our science. He was one of the founders (1879) and for a long time one of the most active members of the Anthropological Society of Washington; and his beneficial, stimulating effect on all branches of anthropology was felt at many a meeting of Section H of the American Association.

Among other friends of anthropology in connection with the Smithsonian Institution, now deceased, it is necessary to mention Dr J. M. Toner and Thomas Wilson.

By the generous endowment of Doctor Toner there were delivered under the auspices of the Institution, between 1873 and 1889, a series of lectures on medical and related topics which included two of special interest to physical anthropology, namely, "The Dual Character of the Brain," by Dr C. E. Brown-Séquard;[5]

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[1] Squier, *Peru*, N. Y., 1877.

[2] Fletcher, On prehistoric trephining and cranial amulets, *Contributions to N. A. Ethnology*, vol. VI.

[3] The Chaclacayo trephined skull; with measurements by Dr Irwin C. Rosse, U. S. A., *Proc. U. S. National Museum*, 1885, pp. 410–412, pl. 22, and list of measurements (appended).

[4] *What is Anthropology?* A Saturday lecture delivered in the U. S. National Museum, March, 1882, 21 pp. The scope and value of anthropological studies, *Proc. A. A. A. S.*, 1884, 365–383. The relation of the mound builders to the historic Indians, *Science*, 1884, III, 658–659. Indians in the U. S., June 30, 1886, *Rep. U. S. Nat. Mus.*, 1885, 902–907. Migration and the food quest: A study in the peopling of America, *Smithsonian Rep.*, 1894, 523–539, map.

[5] Delivered Apr. 22, 1874, published in *Smithsonian Misc. Coll.*, Jan., 1877.

and "The Clinical Study of the Skull," by Dr Harrison Allen.[1] Doctor Toner was also one of the founders of the Anthropological Society of Washington.

Thomas Wilson (1832–1902), previously for several years United States Consul to Ghent, Nantes, and Nice, became attached to the National Museum in 1887 as curator of the Division of Prehistoric Anthropology.[2] While abroad, and particularly in France, he became deeply interested in archeological matters and especially in the remains of early man, subjects which occupied his attention throughout the period of his connection with the Museum. Collaterally he was, however, interested in physical anthropology, and a number of his papers deal with matters relating to that science. It is to be regretted that they were not specific enough to be of lasting value.

His publications of interest to physical anthropology are: "A study of prehistoric anthropology" (*Annual Report U. S. National Museum*, 1888); "Man in North America during the Paleolithic period" (ibid.); "Anthropology at the Paris Exposition" (ibid., 1890); and "The Antiquity of the red race in America" (ibid., 1895).

By 1897 the collections of the United States National Museum had grown to such an extent that a new plan of organization of its departments became necessary. By this plan three large departments were established—Anthropology (in the broader sense of the term), Biology, and Geology, and Professor W. H. Holmes was appointed head curator of the Department of Anthropology, which was subdivided into eight sections.[3] Prof. O. T. Mason remained as curator of ethnology, later serving for several years as acting head curator.

It was Prof. W. H. Holmes, fortunately still living and in full vigor, who conceived the need of and eventually succeeded in adding to his department the Division of Physical Anthropology, the first regular division devoted entirely to this branch of science on this continent. With this end in view and at Professor Holmes' suggestion, an arrangement was made with the Army Medical Museum whereby a larger part of the normal somatological material in that institution (approximately two thousand crania) was transferred to the National Museum in 1898–1899. The division came into actual existence in 1902, in charge of the writer; in 1904 another highly valuable instalment of anthropological material (approximately fifteen hundred crania and skeletons) was transferred to the division from the Army Medical Museum, the latter retaining only specimens of pathological or surgical interest; and subsequently, by coöperation with other institutions and through the help of many friends of the Smithsonian, as well as through field exploration and laboratory work, the collections have increased until today they consist of more than 11,000 racial crania and skeletons, 1,600 human and animal brains, and thousands of photographs, casts, and other objects relating to physical anthropology.

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[1] See Allen's bibliography, page 536 of this article.

[2] See In Memoriam: Thomas Wilson, by O. T. Mason, *American Anthropologist*, IV, April–June, 1902.

[3] See *Report U. S. National Museum for 1897*, Washington, 1899, p. 6, et seq.

In touching on the development of the Division of Physical Anthropology in the National Museum we have passed by a collateral event of much importance, namely, the establishment, in connection with the Smithsonian Institution, of the Bureau of American Ethnology.

In 1879 the Bureau of American Ethnology was definitely organized and placed by Congress under the supervision of the Smithsonian Institution.[1] Several years before this, however, Major Powell, as Director of the Geographical and Geological Survey of the Rocky Mountain Region, began the publication of a series of important volumes called *Contributions to North American Ethnology*, and it was the preparation of these which may really be looked upon as the beginning of the Bureau's existence. Major Powell himself had accomplished important work among the tribes of the Rio Colorado drainage in connection with his geological and geographical researches, and he logically became the first director of the Bureau when separately established.

The Bureau of American Ethnology has not directly occupied itself with somatology; but from the beginning of the important explorations carried on under its auspices the collection of skeletal remains of the American Indians was encouraged, and an important part of the present collections in physical anthropology in the U. S. National Museum proceeded from such field work. Besides this the publications of the Bureau were from the first open to our branch of science, with the result that at this time they contain a respectable number of more or less direct contributions to the subject, and physical anthropology in this country derived much encouragement from this most deserving institution.

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[1] *Handbook of American Indians North of Mexico*, Washington, 1912, I, (4th impression), p. 171 et seq.

Among the members of the Bureau, not now living, several deserve special mention for their services to our branch of science. These are J. C. Pilling, whose bibliographies are of assistance; Dr W. J. Hoffman, who was interested directly in somatology, reporting, among other writings. on "The Chaco Cranium"[1] and on the Menomini Indians;[2] Cyrus Thomas, who during his exploration of the mounds collected many crania now part of our collections; and W J McGee, who contributed to our knowledge of the Sioux and Seri Indians, and gave us, with Muñiz, a fine memoir on Primitive Trephining in Peru.[3]

Papers published by the Smithsonian Institution and its branches relating more or less directly to physical anthropology, and excluding those of living authors, are the following:[4]

1851. Culbertson, T. A. Indian tribes of the upper Missouri. S.R., v.
1852. Stanley, J. M. Catalogue of portraits of North American Indians, and sketches of scenery, etc. S.R., VI.
1855. Letterman, J. Sketch of the Navajo Indians. S.R., x.
1856. Haven, Samuel F. Archeology of the U. S., or Sketches, Historical and

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[1] *Tenth Ann. Report of the U. S. Geol. and Geogr. Survey, of the Terr. for 1876*, Wash., 1878, pp. 453–457, 2 pl.

[2] *Fourteenth Ann. Report Bureau Amer. Ethnology.*

[3] The Seri Indians, *17th Ann. Rep. B. A. E.* With M. A. Muñiz, Primitive Trephining in Peru, *16th Ann. Report B. A. E.*

[4] Abbreviations: S. R., Annual Report of the Smithsonian Institution; S. C., Smithsonian Contributions to Knowledge; S. M., Smithsonian Miscellaneous Collections; P. N. M., Proceedings United States National Museum; B. N. M., Bulletin United States National Museum; R. N. M., Annual Report United States National Museum; C. E., Contributions to North American Ethnology; R. B. E., Annual Report Bureau American Ethnology; B. B. E., Bulletin Bureau American Ethnology,

Bibliographical, of the Progress of information and opinion respecting vestiges of antiquity in the United States. S.R., VIII.

1859. Retzius, A. Present state of ethnology in relation to the form of the human skull. S.R.

1860. Morgan, Lewis H. Circular in reference to the degrees of relationship among different nations. S.M., II.

1861. Morgan, L. H. Suggestions relative to an ethnological map of North America.

1862. Stanley, J. M. Catalogue of portraits of North American Indians. S.M., II.

1862. Reid, A. Skulls and mummy from Patagonia. S.R.

1862. Gibbs, G. Ethnological map of the United States. S.R.

1862. Wilson, D. Lectures on physical ethnology. S.R.

1862. Morlot, A. Lecture on the study of high antiquity. S.R.

1862. Quatrefages, A. de. Memoir of Isidore Geoffrey St. Hilaire. S.R.

1862. Reid, A. Human remains from Patagonia. S.R.

1864. Baegert, Jacob. Aboriginal inhabitants of the California peninsula. S.R.

1864. Dean, John. The gray substance of the medulla oblongata and trapezium. S.C., XVI.

1864. Troyon, Fred. On the crania helvetica. S.R.

1864. Gibbs, G. The intermixture of races. S.R.

1864. Morlot, A. The study of high antiquity in Europe. S.R.

1865. Petitot, E. Account of the Indians of British America. S.R.

1866. Gibbs, G. Notes on the Tinneh or Chepewyan Indians of British and Russian America. S.R.

1866. Von Hellwald, F. The American migration; with notes by Prof. Henry. S.R.

1866. Scherzer; Schwarz. Table of anthropological measurements. S.R.

1867. Darwin, C. Queries about expression for anthropological inquiry. S.R.

1867. Pettigrew, J. B. Man as the contemporary of the mammoth and reindeer in middle Europe. S.R.

1867. Meigs, J. A. Description of a human skull from Rock Bluff, Ill. S.R.

1867. Smart, C. Notes on the Tonto Apaches. S.R.

1867. List of photographic portraits of North American Indians in the gallery of the Smithsonian Institution. S.M., XIV.

1868. Broca, P. History of the transactions of the Anthropological Society of Paris, from 1865 to 1867. S.R.

1870. Swan, James G. The Indians of Cape Flattery. S.C. XVI.

1870. Gardner, W. H. Ethnology of the Indians of the valley of the Red River of the North. S.R.

1870. Blyden, E. D. On mixed races in Liberia. S.R.

1871. Grossmann, F. E. Pima Indians of Arizona. S.R.

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X—CONCLUSION

The preceding notes close a rapid and doubtless imperfect survey of the history of physical anthropology among the English-speaking people of northern America, so far as connected with those no longer living. Interdigitating closely with the more recent chapters of this history is the unfinished, richer, and more organized portion which rests in the hands of those who are still active.

Looking backward into this history, we see on the whole very creditable, though more or less sporadic and irregular, beginnings, and an irregular, often defective, course, yet not without lasting results. The more recent period belongs only to the development proper of the branch—development now based on great and accurately identified collections, nourished by advancing systematic training and regulation of methods, definitely conscious of the immense and complex field of research ahead, and confident that in coöperation with closely allied branches of science physical anthropology is destined to serve worthily these countries and humanity in general.

The influences on and direct participation in American anthropology of various scientific societies and journals, and of foreign men of science, have been mentioned only casually and must be left for a future paper. Suffice it to say here that the foremost among our societies whose activities favored the advance of physical anthropology were the Anthropological Society of Washington (1879–); the American Ethnological Society of New York (1842–; 1899–); the Boston Society of Natural History (1830–); the American Association for the Advancement of Science, Section *H* (1882–); and the American Anthropological Association (1902–). Among journals especial credit is due to the *American Naturalist* (1867–); to *Science* (1880–), and above all to the *American Anthropologist* (1888–), besides which there are the periodical publications of the Smithsonian Institution and its branches, the Reports of the Commissioner of Indian Affairs, the publications of the Peabody Museum of American Archaeology and Ethnology, and those of The Academy of Natural Sciences of Philadelphia, the American Museum of Natural History, and other institutions, which include numerous contributions to physical anthropology. As to foreign men of science who have most influenced the progress of our science in America, the list includes Blumenbach, Gall, Prichard, Lawrence, Anders Retzius, Broca, Quatrefages, Hamy, Topinard, Barnard Davis, Flower, Kollmann, E. Schmidt, and Rudolph Virchow. Finally, there are also a number of additional American names connected with isolated publications or noteworthy collections pertaining to physical anthropology, which will deserve a more extended reference in some future publication on this subject. They include men like Emil Bessels, known for his contributions on Eskimo crania[1] and

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[1] Einige Worte uber die Inuit (Eskimo) des Smith-Sundes, nebst Bemerkungen über Inuit-Schädel, *Archiv für Anthropologie*, VIII, 1875–1876, pp. 107–122.

"The Human Remains found among the Ancient Ruins of Southwestern Colorado and Northern New Mexico";[1] H. Gillman, who wrote on crania and platycnemism in Michigan;[2] Dr George W. Peckham, to whom we owe a contribution on "The Growth of Children" of Milwaukee;[3] David Boyle who in the "Archaeological Reports" of the Province of Ontario reported on Indian crania; Cordelia A. Studley, who wrote on "Human Remains from the Caves of Coahuila, Mexico";[4] Paul Schumacher, to whom we owe the large collections of California crania now in the Peabody Museum at Cambridge and the U. S. National Museum; and Ad. F. Bandelier, who collected a large amount of skeletal material in Bolivia for the American Museum of Natural History.

Writings on physical anthropology in Mexico and the countries to the south, if we exclude those of the living, are very meager. Lund's contributions in Brazil and Ameghino's in Argentina have been dealt with in another place.[5] In Peru a collection of crania had been made by Raimondi; the foreign contributions to Peruvian anthropology are given in the writer's reports on that country.[6] In Mexico, if we exclude what has been done relatively recently by a few living workers, we have little to mention except the contributions of Morton, and those by two or three French authors;[7] the history of anthropology in that country, however, is now receiving the attention of Dr Nicolas León.

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[1] *Bulletin U. S. Geological and Geographical Survey*, II, 1876.

[2] See the bibliography of the Smithsonian Institution, p. 549 of this paper.

[3] *6th Annual Report State Bd. of Health of Wisconsin.*

[4] *Sixteenth Report Peabody Museum*, Cambridge.

[5] Early Man in South America, *Bull. 52, B.A.E.*

[6] *Smithsonian Misc. Coll.*, 1911 and 1913.

[7] E. T. Hamy, *Mission scientifique du Mexique. Anthropologie*, Paris, 1891. Also Quatrefages and Hamy, *Crania Ethnica*,